Space Weather Forecast

Issued on Monday, 13 May 2024 at 01:12 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor-Moderate Geomagnetic storms.
Decreasing Chance of X-class flares (Strong radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is High with X-ray activity showing frequent Moderate-class activity, peaking with a strong flare from the large region in the southwest at 12/1626 UTC. There are thirteen sunspot groups on the disc, with a new region in the southeast. The sunspot region in the southwest is the largest and most magnetically complex region. No further significant Coronal Mass Ejections (CMEs) were observed to depart the sun towards Earth during the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds have been unusually enhanced over the past 24 hours following the two CME impacts late on the 10 May. Solar winds have been mostly at very strong levels throughout the period, with a peak of 1005 km/s at 12/0055 UTC, followed by an unsteady decline to 800 km/s. A probable weak CME arrival was observed at 12/0855 UTC. The magnetic field started the period at Moderate to Strong levels with an overall decline to weak levels. The all-important north-south component was weak to moderate.
The net result of the above solar wind measures was a Strong storm at first with a temporary decline to Unsettled to Active levels and is now at minor-moderate storm levels

Energetic Particles / Solar Radiation: Solar radiation levels showed a downward trend to below Minor storm levels by 12/1200 UTC

Four-Day Space Weather Forecast Summary

Solar Activity: Isolated Strong flares are probable in the coming days with further Moderate flares expected, primarily from the large sunspot region in the southwest disc.

Solar Wind / Geomagnetic Activity: A CME from a Strong flare that departed the sun from the large region in the southwest at 11/0115 UTC is anticipated to impact the Earth at the start of Day 1 (13 May). A further CME associated with a Moderate flare from the same region at 11/1526 UTC, may arrive later on Day 1 or early on Day 2 (13/14 May. Geomagnetic activity will probably be near Unsettled-Active levels. If and when the CMEs arrive activity is likely to become Minor-Moderate with an isolated Strong storm interval possible. Activity is expected to wane through Days 3 and 4 (15 and 16 May), however confidence at the end of the period is low and the forecast may change should further large Earth-directed CMEs occur.

Energetic Particles / Solar Radiation: Solar radiation levels are declining and below Minor Storm levels and probably remaining at similar levels in the absence of any further significant flaring from the large sunspot in the southwest disc. The region is, however, moving into a more favourable location for proton response in the coming days.

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Met Office Space Weather Forecast

Aurora Forecast

Further CMEs (Coronal Mass Ejections) may possibly impact Earth through 13 May. This gives potential for auroral activity during Monday night, but activity is likely to be considerably less than recently and potential sightings are more likely for northern areas, mostly Scotland, if cloud breaks occur.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	90	50	10	10
Strong	G3	Yes	50	20	1	1
Severe	G4	No	5	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	60	40	20
Very Active	R3 to R5 X	Yes	60	40	20	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	30	30	20	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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